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the magnetic meridian on November 20, in about long. 155° 30′ east. Captain Scott then proceeded west with two men, Evans and Lashly, for eight and a half days, and reached a point 270 miles from the ship, in lat 78° south and long. 146° 30′ east. The glacier was regained on December 14 and the ship on Christmas Eve.

The result of these two last-named journeys is to show that the interior of Victoria Land stretches continuously at a height of 9,000 feet, and is evidently a vast continental plateau. No land was visible above the ice after losing sight of the ranges which front the coast. The glacier valley affords magnificent scenery, and gives a natural geological section of the mountain. Mr. Ferrar and two men accompanied Captain Scott to the summit, and on the return journey they explored the valley in detail, and discovered sandstone, with plant remains. The plants are dicotyledons, probably of Miocene Age.

The result of the journeys made respectively by Messrs. Royds and Bernacchi and Lieutenant Barne and Mr. Mulock is to confirm the conclusion previously arrived at by Captain Scott, Lieutenant Shackelton, and Dr. Wilson, that the whole of their great sledge journey of the previous year was made on sea-ice. It would thus seem that there is a great arm of the sea which extends southward for an unknown distance between Victoria Land on the west and the rising land at the east end of the great Ross Barrier.

The expedition has thus resulted in a large addition to geographical knowledge, and it must be a source of great satisfaction to all to know that the *Discovery* has returned to civilization in safety and, with the exception of the sailor who lost his life during the first year, without leaving a man behind.

NEW MAPS.

AMERICA.

ALASKA.—Map of Alaska. Natural scale, 1:2,500,000, or 39.4 statute miles to an inch. Contour interval, 1,000 feet. Compiled by E. C. Barnard, topographer, under the direction of R. U. Goode, geographer. Preliminary Edition. U. S. Geological Survey, Washington, D. C., 1904.

This notable production marks a turning-point in the mapping of Alaska. It is the first map to express the topographical features or relief of the Territory by means of contours. This desirable end was made possible by the work of numerous Geological Survey parties in the six years, 1898–1903, the coast surveys of the U. S. Coast and Geodetic Survey and maps supplied by the Army and Revenue Marine Services, the Canadian Government, and other sources. The map is the result, in fact, of the great recent activity in carrying out accurate surveys which now cover about 150,000 square miles of the total area of about 590,000 square miles. At least two-thirds of the remainder of the Territory have been roughly mapped. An inset shows the areas that have been covered by surveys, thus indicating the cartographic data that are most reliable.

The growing interest in the Territory, due to the development of its mining and other resources, makes the map a most timely contribution to our knowledge of Alaska, notwithstanding the fact that it is based only in part on accurate mensuration. Changes will be necessary in later editions, but we have the authority of Mr. Alfred H. Brooks for the statement that the general facts of the relief and drainage are known to be correctly indicated on the present map. This is a great deal more than any earlier map has given us.

Though the contour interval is 1,000 feet, the lines, of course, are quite close together among the steeper mountains on this map of comparatively small scale. The brown of the contours contrasts sharply with the blue of the glaciers, and thus the areas in which glacial activity is now conspicuous are brought out clearly.

CANADA.—Geologische Karte von West-Canada. Natural scale, 1:7,500,000, or 118.35 statute miles to an inch. *Petermanns Mitteilungen*, Vol. 50, No. 1. Justus Perthes, Gotha, 1904.

The geological detail, based on the work of the Geological Survey of Canada, is laid down on a part of sheet 83 of the latest edition of Stieler's Handatlas. The accompanying letterpress is by Prof. Dr. H. Haas of Kiel, who adds a bibliography to his systematic discussion of the geology of the whole of Canada.

CANADA.—Les Ports Canadiens. 13 plates: 1—Gulf of St. Lawrence and St. Lawrence River. Scale, 1:3,000,000, or 47.34 statute miles to an inch; inset of Halifax harbour; includes the gulf and river to Quebec. 2—St. Lawrence River between Montreal and Quebec. Scale, 1:600,000, or 9.4 statute miles to an inch; profile of river-bed. 3—Montreal. Scale, 1:25,000, or 0.39 statute miles to an inch. 4—Profiles of wharves, dikes, etc., at Montreal. 5—View of the river front at Montreal. 6—Harbour dredge. 7—Quebec. Scale, 1:25,000; profiles of elevators, etc. 8—Plans of commercial basins at Quebec, with transverse sections of embankments and height of water at various stages of the tide. 9—Plans of dry docks at Quebec and Halifax. 10—Halifax. 11—St. John. Scale, 1:25,000; cross sections of breakwater and piers. 12—Proposed Chignecto Ship Canal between the Bay of Fundy and Gulf of St. Lawrence. Scale, 1:200,000, or 3.1 statute miles to an inch. 13—Eastern Canada (Quebec and Ontario). Scale, 1:1,500,000, or 78.9 statute miles to an inch. Vve Ch. Dunod, Paris, 1898.

UNITED STATES.—Les Ports des États-Unis. 48 plates. 1—Roadstead and Port of Portland (Me.). Scale of bay, 1:50,000, or 0.7 statute miles to an inch; scale of port, 1:15,000, or 1,250 feet to an inch. 2—Sandy Bay. Scale, 1:20,000, or 0.3 statute miles to an inch; contours showing limits of highest and lowest tides along the beach. 3—Boston and its environs. Scale, 1:80,000, or 1.2 statute miles to an inch. 4—Reclaimed lands in Boston Harbour. Scale, 1:25,000. 5—Railroad terminals in Boston (showing their relations to one another and the docks). Scale, 1:25,000. 6—Plans of railroad terminals in Boston. 7—New York and its environs. Scale, 1:150,000, or 2.38 statute miles to an inch. 8—Port of New York (Channels of the Lower Bay, scale, 1:50,000; and Brooklyn water front from Gowanus Bay to Buttermilk Channel, scale, 1:12,500. 9–10—Plans of dredges at New York. 11—Port of New York (showing pier line and docks from Buttermilk Channel to 72d Street, including New Jersey from Communipaw to Weehawken). Scale, 1,25,000. 12–27—Plans, sections and views illustrating the construction of docks, elevators, railroad terminals, ferry stations, ferryboats, bridges, etc., at New York. 28—The Delaware (including Delaware Bay from the Atlantic to Philadelphia). Scale, 1:300,000, or 4.73 statute miles to an inch; profiles of breakwaters, ice-breakers, etc. 29—Plan of Philadelphia. Scale, 1:50,000. 30—Philadelphia water front (Delaware), with water front between Market and Reed Streets, on enlarged scale. 31—Philadelphia railroad terminals. 32–35—Baltimore with its environs, docks and terminals. 36–41—Newport News, Portsmouth and Norfolk, with special attention to the shipbuilding plant and the railroad terminals. 42–43—Charleston, S. C., before and after the construction of the jetties. 44–45—Savannah and the terminals of the Georgia Central R.R. 46—Elevations and plans of the "Puget Sound Dry Dock." 47–48—Atlantic Coast of the United States. Scale, 1:2,500,000, or 39.4 statute miles to an inch. Vve Ch. Dunod, Paris, 1904.

These two fine series of maps, plans and views respectively illustrate Vol. I and III of "Les Ports maritimes de l'Amérique du Nord sur l'Atlantique," written by Baron Quinette de Rochemont and H. Vétillart, the last volume of which has just been printed. The maps are excellent reproductions of official hydrographic and port surveys in Canada and the United States. Soundings are given in metres and decimetres, the limits of navigable channels in rivers are indicated, and very many contours of the sea and river beds are shown. Most of the port plans are large enough to show all important details of the water front; and especial attention is given to the facilities for transshipment between land and water. The numerous plans and profiles showing in considerable detail the instruments by which the various harbour improvements are made will particularly interest engineers.

THE UNITED STATES.—Geologic Atlas of the United States.

No. 99. Mitchell Folio, South Dakota. Area, 863 square miles between parallels 43° 30′ and 44° N. and meridians 98° and 98° 30′ W. Nearly a smooth plain sloping northeast and broken only by the beds of streams which have banks of moderate height. The surface is naturally covered with grass only near the James River and at a few points along its tributary Firesteel Creek. The surface is mantled with glacial deposits, under which, as many deep wells show, are extensive sheets of clays and sandstones of Cretaceous Age resting on a floor of quartzite and granite, possibly of Archean Age. The older rocks are frequently exposed along the James River, but metamorphic or igneous rocks are found on the surface only as boulders in the drift. The James River and Firesteel Creek are the only streams with running water the year around. Several water-bearing beds in the Dakota and Benton sandstones yield more or less adequate supplies for irrigation. The soils are stony, sandy, and clayey.

No. 100. Alexandria Folio, South Dakota. Area, 863 square miles. It adjoins the Mitchell quadrangle on the east and largely shares its characteristics. The artesian water supply is more copious than in the Mitchell quadrangle, the lower horizons of the Dakota sandstone particularly affording an abundant supply.

No. 102. Indiana Folio, Pennsylvania. Area, 227 square miles between parallels 40° 30′ and 40° 45′ N., and meridians 79° and 79° 15′ W. It is in the Appalachian province, its drainage is entirely into the Allegheny River, and it conforms in geologic structure with the Allegheny Plateau. The rocks are bent into a series of low folds, which decrease in magnitude westward. The mineral resources are coal (thus far mined chiefly for local supply), natural gas, clay, sandstone, limestone, and sandy and clay loam soils, which, with intelligent treatment, yield profitable returns.

Brazil.—Übersicht der Regenteilung und der Meteorologischen Stationen in Süd-Brasilien. Scale, 1:7,500,000, or 118.3 statute miles to an inch. Justus Perthes, Gotha, 1904.

The map accompanies the monograph by E. L. Voss, entitled "Beiträge zur Klimatologie der südlichen Staaten von Brasilien," which forms Supplement No. 145 to *Petermanns Mitteilungen.* Five tints show the mean annual precipitation in the area comprising the States of São Paulo, Paraná, Santa Catharina, and Rio Grande do Sul. The German colonies are indicated, and the meteorological stations whose data were utilized are distinguished from those that have newly been erected. Diagrams show the average daily range of temperature and rainfall in some of the towns.

EUROPE.

Scotland.—Bathymetrical survey of the freshwater lochs of Scotland. (1) Natural scale for separate maps of the lakes, 1:21,120, or one statute mile to three inches. (2) Natural scale for map of head waters of the Tay, with surface geology, 1:127,000, or two statute miles to an inch. Under the direction of Sir John Murray and Laurence Pullar. The *Geographical Journal,* January and April, 1904.

The January instalment of these fine maps concludes the work of the survey among the lochs of the Tay basin and deals with over thirty of the smaller lochs. Fifteen tints on the map of the upper Tay show the distribution of the surface geological formations and the lines of faulting, including the great fault along the Highland border which divides the Tay basin geologically into two parts, the metamorphic rocks of the eastern Highlands on the northwest and rocks of Old Red Sandstone Age on the southeast. The April instalment presents twenty lochs in the Assynt district of Sutherlandshire, which drains about 150 square miles, or twelve times the area of the lochs.

ASIA.

China.—Wege-Aufnahmen im Gebirgslande des Ta-pa-shan. Natural scale, 1:400,000, or 6.3 statute miles to an inch. By Dr. Karl Vogelsang. *Petermanns Mitteilungen,* Vol. 50, No. 1, 1904.

The map illustrates a paper by Dr. Vogelsang, a Prussian mining assessor, on his month's journey in 1900 to the north of the Yangtse River, starting from and returning to the river and traversing the northwest part of Hupeh, the southeast corner of Shensi and the northeast corner of Szechuen. His starting-point was Ichang, and the journey ended at Wu-shan, about 100 miles further up the Yangtse. Most of his route was through country that had not been visited by scientific explorers. The map gives many place-names, and is coloured, to show the geological features along the route. No commercial minerals were discovered excepting coal, which is of local importance.

Kamschatka.—Karten von Kamtschatka. (1) Topographische Karte, from the map prepared by Mining Engineer K. J. Bogdanowitsch and Captain N. N. Leliakin, and published in 1901 on a scale of 1:840,000. (2) Geologische Karte, by Prof. Bogdanowitsch. Scale, 1:2,000,000, or 31.56 statute miles to an inch. *Petermanns Mitteilungen,* Vol. 50, No. 3. Justus Perthes, Gotha, 1904.

These maps accompany an article by Prof. Bogdanowitsch on the geology of the peninsula, which, on account of the fur, fishing, and mining interests that are beginning to develop, is attracting more attention. The topographic map is based upon the long-route surveys of the authors, and authentic materials which earlier explorers had contributed. Many elevations are indicated by figures, and numerous volcanoes are shown from the south nearly to the north end of the peninsula. The geological map shows the rock formations along half of the west coast, and in a broad strip through the centre of the country. The places where gold, copper, iron, sulphur, and coal were discovered are indicated.

AFRICA.

NATAL.—Map of Natal showing mine department districts. Scale, 20 statute miles to an inch. Report on the Mining Industry of Natal for 1902. Pietermaritzburg, 1903.

This map supplements a very full report on the mining industry of the colony. It shows the distribution of the mineral deposits, in which respect Natal is highly favoured, and particularly in the extent of its coal measures.

MR. G. W. LITTLEHALES' GRAPHIC SOLUTION OF THE ASTRONOMICAL TRIANGLE AND SOME OF ITS VARIED APPLICATIONS TO THE PROBLEMS OF NAVIGATION.

BY

J. W. FROLEY.

A paper read before the Philosophical Society of Washington, in October, 1903, by Mr. G. W. Littlehales, entitled "A New and Abridged Method of Finding the Locus of Geographical Position and the Compass Error," outlines a work prepared by him which has for its aim the lightening of the labours of every ocean navigator adopting it. It is well known to mariners, and all others as well who have given attention to the subject, that the life of the navigator is absorbed in the tedium of arithmetical processes involving the rules of logarithms applied to the formulæ of spherical trigonometry. When his burdens and responsibilities are considered, it is needless to say that any means for rendering the task of the navigator easier is not only a boon to himself but an advance in the maritime interests of the world.

An important problem in navigation is the laying down accurately on the chart the Sumner Line of Position. It requires the accurate determination of the altitude and azimuth of a celestial body due to an estimated position of the observer. The navigator, having measured the true altitude of a celestial body and then computed the altitude and azimuth of the observed body due to the estimated geographical position of the ship, can draw a line upon his chart through this estimated geographical position of the ship at right angles to the azimuth or true bearing of the observed